RP 102 Wind Turbine Gearbox Oil Sampling Procedures

The following recommended practice (RP) is subject to the disclaimer at the front of this manual. It is important that users read the disclaimer before considering adoption of any portion of this recommended practice.

This recommended practice was prepared by a committee of the AWEA Operations and Maintenance (O&M) Committee.

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Purpose and Scope

The scope of “Wind Turbine Gearbox Oil Sampling Procedures” addresses the methods for taking clean and respective wind turbine gearbox oil samples. Samples that are taken properly will provide the user with accurate data.

The general procedure applies to wind turbine lubrication systems. There are several different wind turbine gearboxes and lubrication systems. This paper will focus on two commonly used systems. These recommendations will give proper procedure for the handling of containers and oil before and after samples have been taken to ensure that data obtained from oil analysis is accurate.

Introduction

Standardizing oil analysis from a specific sampling port is important. Taking samples from different ports may result in providing skewed samples to the laboratory for analysis.

Taking respective oil analysis samples from the same port on each turbine can provide data to wind turbine personnel that will allow accurate comparisons between turbines. Establishing which turbines should be scheduled for maintenance can then be easily assessed.

Gearbox Oil Sampling Procedures

1. Preparing for Oil Sampling

1.1. Normal samples are typically taken in 3.5oz bottles. If extra laboratory tests are required taking a 1-quart sample may be required.

1.2. Oil samples should be placed in a clean unbreakable container. Oil manufacturers and analysis laboratories carry special bottles available upon request.

1.3. Before sampling, bottles must be clearly marked by labeling with the following information:

- Company/Site Name
- Turbine Number
- Gearbox Model/Type
- Oil Manufacturer
- Oil Name
- Date Sampled
- Time Sampled

Labeling ensures oil analysis is associated with the correct oil sample for data tracking purposes.

2. Prior to Taking the Gearbox Oil Sample

2.1. If the turbine has been running, turn the oil pump on for 1-minute before taking an oil sample. If the turbine has not been running make sure to activate the oil pump for a minimum of 5 minutes before taking an oil sample.

2.2. Make sure tubes, bottles, sample ports, and hoses are free of debris before taking the sample. This ensures no residual contaminants enter your sample.

2.3. Oil samples must be taken from a port before the oil filter. Samples must be taken from the same location each time to create a solid comparison. On all systems, only take samples from the recommended locations. (*See Figures A & B*)

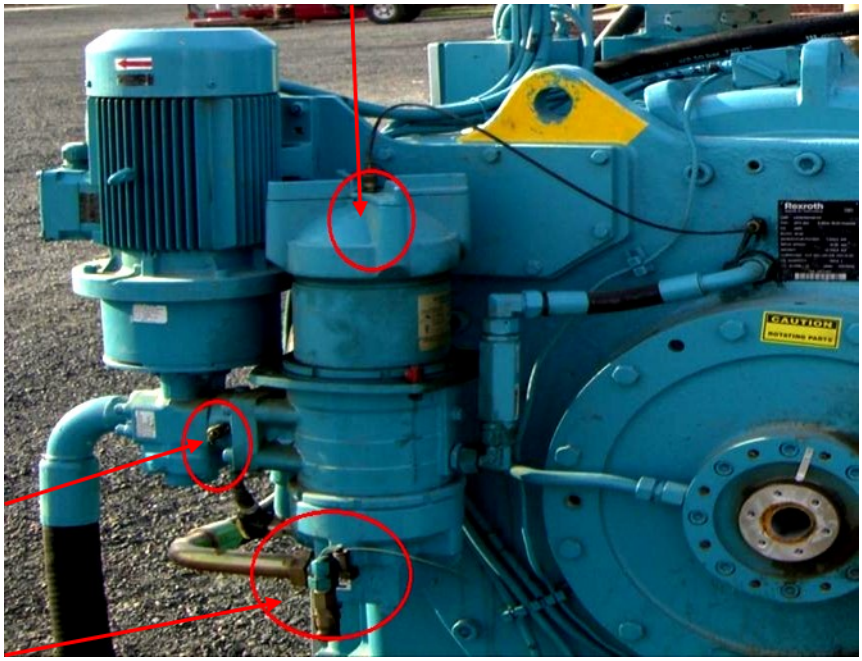

Figure A

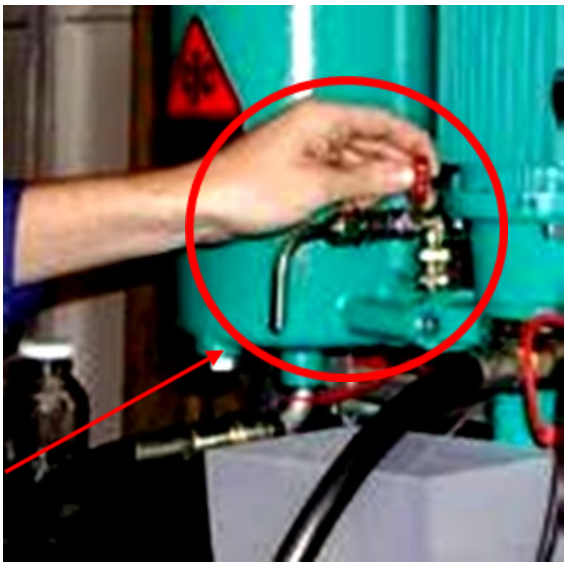

Figure B

3. Taking The Oil Sample (System 1)

3.1. Purge with approximately the same amount of oil as the sample bottle size from a recommended sampling port. (*See Figure A*)

3.2. After purge sample is drawn, seal the bottle immediately.

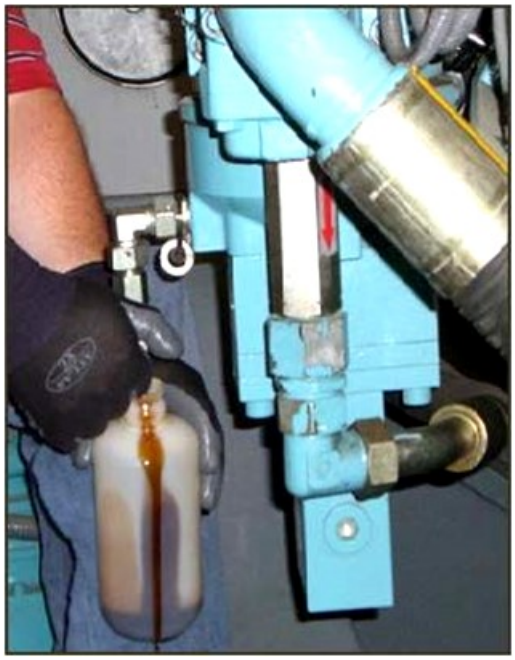

Figure C

3.3. Open the clean sample bottle when ready to take the sample.

3.4. Open the clean bottle and place under sample port. Make sure the bottle is not touching the sample port.

3.5. Fill the 3.5oz clean bottle 80-90% full and place the cap on the bottle immediately.

3.6. Replace any hoses or caps on oiling system to ensure no leakage before exiting.

4. Taking The Oil Sample (System 2)

4.1. Open and close the recommended sampling port valve several times to purge the system, draining the purge oil into a container. Purge with approximately the same amount of oil as the sample bottle size. (*See Figure B)*

4.2. After purge sample is drawn seal the bottle immediately.

Figure D

4.3. Open the clean sample bottle when ready to take the sample.

4.4. Open clean sample bottle and place under the sample port. Make sure bottle is not touching the sample port.

4.5. Fill the 3.5oz clean bottle 80-90% full and place the cap on the bottle immediately.

4.6. Shut off valve and ensure there are no leaks before exiting.

Summary

Proper gearbox oil sampling methods are crucial for comparing samples from one turbine to another or from sample to sample in the same turbine. This will assist in properly scheduling maintenance, as a good track record will be established. Many gearboxes have different filtration systems and sampling methods, however taking a clean sample from the same port will provide a good respective sample on a consistent basis.